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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/782,790

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Kazuhide Tanaka

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EXAMINER

WARTALOWICZ, PAUL A

ART UNIT

PAPER NUMBER

1735

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/782,790	<b>Applicant(s)</b> TANAKA ET AL.	
	<b>Examiner</b> PAUL A. WARTALOWICZ	<b>Art Unit</b> 1735	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 22 October 2010.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 9-12, 14-17 and 19-28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 9-12, 14-17 and 19-28 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                    | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)         | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/22/10 has been entered.

### ***Response to Arguments***

Applicant's arguments filed 10/22/10 have been fully considered but they are not persuasive.

Applicant argues that Thieme does not disclose or suggest that the intermediate layer operates as a junction auxiliary material. Applicant also argues that Thieme does not disclose or suggest that the intermediate layer electrically and mechanically unified and integrated metallurgically with the metal base member and the cladding layer in a unitary block.

However, it appears that Thieme teaches a substantially similar product as recited in the claims as discussed in the Office Action mailed 6/22/10 at pages 2-3. It is unclear how the addition of the limitation "integrated metallurgically" distinguishes over the prior art. Applicant states that in order to unify the materials metallurgically, a junction auxiliary material should be used as an intermediate layer. However, it is unclear how a "junction auxiliary material" of the claim is substantially different from the

Art Unit: 1735

matrix disclosed in Theime. Both the (claim) junction auxiliary material and (Theime) metal matrix comprise copper in accordance with the claims. Additionally, the pictorial comparison of the claimed invention to Theime appears to be inaccurate. In the representation of the wire of Theime, it appears that a third layer of metal matrix is disposed between the barrier layer and laminate layer (See para. 0016).

Applicant argues that it would be impossible to form the Theime product with metallurgical integration/unification at the temperature disclosed in Theime and that the Thieme product is obtained via mechanical connection and pressure.

However, it appears that applicant is referring to paragraph 0095 of Theime in which the wire is drawn at a temperature of 250°C. However, it appears that after this drawing step, the composite is heated to a temperature of 900°C as disclosed at paragraph 0106 in Theime. This temperature range overlaps with that disclosed by applicant at page 25, lines 19-28. Based on the comparable disclosures of Thieme and the applicant, it appears that Theime teaches a substantially similar heat treatment to that instantly claimed. Where the claimed and prior art product(s) are identical or substantially identical, the burden of proof is on applicant to establish that the prior art product(s) do not necessarily or inherently possess the characteristics of the instantly claimed product(s), see *In re Best*, 195 USPQ 430.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the

Art Unit: 1735

art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 9-12, 14-17, 19-28 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The recitation in claim 9, line 11, claim 10, line 13, claim 21, line 11, claim 22, line 12, claim 25, line 9, claim 27, line 8 of "mechanically unified and integrated metallurgically" does not appear to have support in the specification as originally filed. It is requested that applicant point out the recitation in the specification that lends support to this recitation.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 9-12, 14-17, 19-28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The recitation in claim 9, line 11, claim 10, line 13, claim 21, line 11, claim 22, line 12, claim 25, line 9, claim 27, line 8 of "mechanically unified and integrated metallurgically" renders the claims indefinite. It is unclear what is meant by "integrated metallurgically". Is there a special "bond" between the layers that are integrated metallurgically? It is unclear how one would join two layers such that the layers would be "metallurgically" integrated. It appears that the claims only require that the layers are

Art Unit: 1735

composed of claimed metals/materials. It is unclear what the metes and bounds of the claims are as the term "metallurgically" is ambiguous.

***Claim Rejections - 35 USC § 102/103***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 9, 10, 12, 14, 15, 17, and 19-22 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Thieme et al. (U.S. 2003/0036482).

Art Unit: 1735

Thieme et al. teach magnesium boride superconducting wires [0002] wherein the magnesium boride, having a density greater than 95% (Abstract) is surrounded by tantalum, niobium, nickel, nickel alloys, iron, or molybdenum, wherein the wire further comprises a metal laminate on the outside of this barrier layer selected from copper, copper alloys, stainless steel, aluminum, aluminum alloys, or nickel alloys [0016]-[0018].

Additionally, Thieme et al. teach a diffusion barrier surrounding the superconductor comprising iron, nickel alloys, tungsten, and molybdenum (this layer corresponds to the metal cladding layer of the instant claims, [0016]) wherein the matrix, which overlays the diffusion barrier layer, is copper (this layer corresponds to the junction material between the base metal and the metal cladding of the instant claims, [0015]), wherein the laminate, overlaying the matrix, is made of copper alloy, *inter alia* (this layer corresponds to the metal base of the instant claims, [0018]).

Additionally, it appears that the diffusion barrier layer (cladding layer) can have an electric resistance of  $7\ \mu\Omega$  or less at room temperature for other embodiments when formed of nickel, *inter alia*. Additionally, it appears that for some embodiments the (diffusion barrier) cladding layer inherently has a Vickers hardness of at least 50 at room temperature as it is made of a similar element, eg. iron, as that instantly claimed.

Additionally, it appears that the laminate (metal base member) can have a Vickers hardness of at least 50 at room temperature as it is made of a substantially similar element, eg. stainless steel containing iron, as that instantly claimed.

Additionally, it appears that for some embodiments the laminate (metal base member)

Art Unit: 1735

inherently has an electric resistance of  $7\ \mu\Omega$  or less at room temperature as it is made of a substantially similar element, eg. copper and nickel, as that instantly claimed.

Additionally, as the laminate (metal base member) covers the matrix (junction auxiliary material) and the barrier layer (cladding layer) [0018], it appears that the metal base member is coaxial with the tubular-shaped metal cladding layer.

Thieme teaches that one or more Mg-B regions are embedded in the matrix [0012]. It appears that a barrier layer (cladding layer) would accompany each Mg-B region [0016] such that there is a plurality of cladding layers as in instant claims 21, 22.

Regarding the limitation of the junction auxiliary material electrically and mechanically unified and integrated metallurgically with the base member and cladding layer in a unitary block and that there would not be a gap formed between the metal base wire member and the cladding layers, it appears that Thieme teaches a heat treatment that is substantially similar to the heat treatment instantly claimed [0095] such that one of ordinary skill would recognize that the product produced by the heat treatment of Thieme would inherently exhibit the junction auxiliary material electrically and mechanically unified with the base member and cladding layer in a unitary block and that there would not be a gap formed between the metal base wire member and the cladding layers.

Where the claimed and prior art product(s) are identical or substantially identical, the burden of proof is on applicant to establish that the prior art product(s) do not necessarily or inherently possess the characteristics of the instantly claimed product(s), see *In re Best*, 195 USPQ 430.



Any difference imparted by the product by process limitations would have been obvious to one having ordinary skill in the art at the time the invention was made because where the examiner has found a substantially similar product as in the applied prior art the burden of proof is shifted to the applicant to establish that their product is patentably distinct not the examiner to show the same process of making, see *In re Brown*, 173 USPQ 685, *In re Fessmann*, 180 USPQ 324, *In re Spada*, 15 USPQ2d 1655, *In re Fitzgerald*, 205 USPQ 594 and MPEP 2113.

As to the limitation of "is assembled into", it is unclear how this limitation lends a patentable distinction between the claimed invention and the prior art. It appears that the prior art meets this limitation as the superconductor and covering metal are abutting the base material (outer covering).

Regarding claims 12 and 17, Theime teaches that the magnesium boride has a density greater than 95% (Abstract).

Regarding claims 14 and 19, Theime teaches that the diffusion barrier surrounding the superconductor comprises nickel alloys and molybdenum (this layer corresponds to the metal cladding layer of the instant claims, [0016]).

Regarding claims 15 and 20, Theime teaches that the laminate (metal base member) comprises nickel alloys [0018].

Regarding claim 21, Theime teaches that the laminate (metal base member) comprises stainless steel (which includes iron) [0018].

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 11 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thieme et al. (U.S. 2003/0036482) in view of Nakahara et al. (U.S. 6337307).

Thieme et al. teach a compound sheath as described above.

Thieme et al. fail to teach a plurality of the single-core or multi-core wires are assembled into the base metal and they are twisted.

Nakahara et al. teach a superconductor (col. 1) wherein a plurality of single-core wires are assembled into a base metal that are twisted (col. 11-12).

It would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide a plurality of single-core wires assembled into a base metal that are twisted in Thieme et al. in order to produce a known superconducting wire as taught by Nakahara et al.

Claims 9, 10, 12, 14, 15, 17, and 19-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thieme et al. (U.S. 2003/0036482) in view of Wong (US 5470821) and Dunand (US 6995119 in reliance on provisional 60/295,447).

Art Unit: 1735

Theime teaches a method as described above in claims 9, 10, 12, 14, 15, 17, and 19-22.

Regarding claims 23, 24, 25 and 26; Theime fails to teach that the metal matrix (intermediate layer) is a tin alloy.

Wong, however teaches a superconductor material (col. 1) wherein a metallic matrix comprises tin for the purpose of promoting crystalline growth (col. 4).

Dunand teaches that tin is selected in applications with magnesium boride because tin is non-reactive with magnesium boride (col. 5).

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide a tin matrix in Theime in order to promote crystalline growth (col. 4) and because tin is non-reactive with magnesium boride (col. 5) as taught by Wong and Dunand, respectively.

Additionally, it appears that the addition of tin in the matrix would give a substantially dense composite structure after heat treatment, such that the combined prior art would inherently exhibit the junction auxiliary material electrically and mechanically unified with the base member and cladding layer in a unitary block.

Regarding claims 12 and 17, Theime teaches that the magnesium boride has a density greater than 95% (Abstract).

Regarding claims 14 and 19, Theime teaches that the diffusion barrier surrounding the superconductor comprises nickel alloys and molybdenum (this layer corresponds to the metal cladding layer of the instant claims, [0016]).

Art Unit: 1735

Regarding claims 15 and 20, Theime teaches that the laminate (metal base member) comprises nickel alloys [0018].

Regarding claim 21, Theime teaches that the laminate (metal base member) comprises stainless steel (which includes iron) [0018].

Regarding claim 26, it appears that Theime teaches the iron containing barrier layer is abutting the magnesium boride [0016].

Where the claimed and prior art product(s) are identical or substantially identical, the burden of proof is on applicant to establish that the prior art product(s) do not necessarily or inherently possess the characteristics of the instantly claimed product(s), see *In re Best*, 195 USPQ 430.

Any difference imparted by the product by process limitations would have been obvious to one having ordinary skill in the art at the time the invention was made because where the examiner has found a substantially similar product as in the applied prior art the burden of proof is shifted to the applicant to establish that their product is patentably distinct not the examiner to show the same process of making, see *In re Brown*, 173 USPQ 685, *In re Fessmann*, 180 USPQ 324, *In re Spada*, 15 USPQ2d 1655, *In re Fitzgerald*, 205 USPQ 594 and MPEP 2113.

Claims 11 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thieme et al. (U.S. 2003/0036482) in view of Wong (US 5470821) and Dunand (US 6995119 in reliance on provisional 60/295,447) and Nakahara et al. (U.S. 6337307).

Art Unit: 1735

Theime et al. teach a compound sheath as described above.

Theime et al. fail to teach a plurality of the single-core or multi-core wires are assembled into the base metal and they are twisted.

Nakahara et al. teach a superconductor (col. 1) wherein a plurality of single-core wires are assembled into a base metal that are twisted (col. 11-12).

It would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide a plurality of single-core wires are assembled into a base metal that are twisted in Theime et al. in order to produce a known superconducting wire as taught by Nakahara et al.

Claims 27 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thieme et al. (U.S. 2003/0036482) in view of Wong (US 5470821) and Dunand (US 6995119 in reliance on provisional 60/295,447) and Tosmic (US 2002/0198111).

Theime teaches a superconducting wire as taught above in claim 25. In addition, Theime teaches that the metal laminate is stainless steel (corresponds to layer of the iron alloy surrounding a magnesium boride wire member and tubular shaped copper portion) [0018].

Theime, however, fails to teach that the tubular shaped portion surrounding the magnesium boride wire member, which is surrounded by intermediate layer and the iron alloy outer layer, is copper.

Art Unit: 1735

Tosmic, however, teaches a magnesium boride wire [0002] wherein the magnesium boride core is surrounded, and abutted, by a layer of copper because the reactivity of the copper with the magnesium diboride is favorable [0016].

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide the magnesium boride core of Theime surrounded, and abutted, by a layer of copper because the reactivity of the copper with the magnesium diboride is favorable [0016] as taught by Tosmic.

Art Unit: 1735

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PAUL A. WARTALOWICZ whose telephone number is (571)272-5957. The examiner can normally be reached on 8:30-6 M-Th and 8:30-5 on Alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jessica L. Ward can be reached on (571) 272-1223. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Paul A Wartalowicz/  
Examiner, Art Unit 1735